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Livestock concentrations - where are they?

By Martin Beaulieu

The number of livestock farms in Canada has shrunk over time. However, the number of large farms is on the rise. Large farms can be associated with large concentrations of animals and manure in some regions.

Manure is a natural fertilizer that improves the soil. It is not always considered a waste product. But is it "too much of a good thing"? Perhaps…if there is too much in the same place. Probably… if there is not enough land to spread it on. Also, does it matter if it comes from small or large farms, or from pig or dairy farms?

The building of large barns may make many neighbours wonder how their quality of life would be affected. Scientists, academics and farmers may debate the effect of higher concentrations of livestock or manure on air and water quality. Where should they focus their attention?

This article gives a "snapshot" (see map insert) of where the larger concentrations of livestock were in May 1996. This information would be useful to planners, investors, non-governmental organizations, rural communities, and governments. This could help them decide where to expand livestock production without putting the environment at risk.

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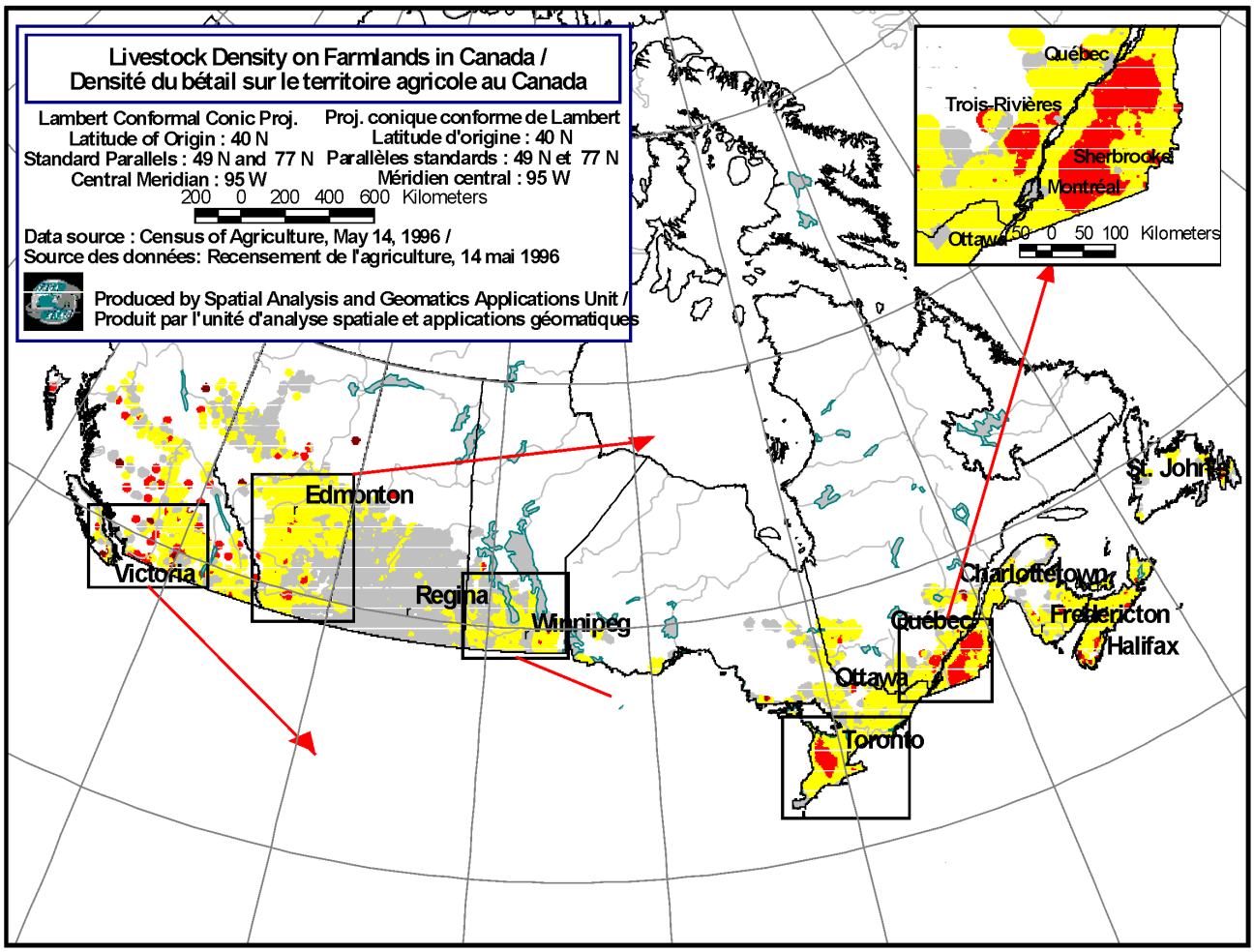


Where are the higher concentrations of livestock?

To determine if the livestock were widely distributed or clustered in some regions, the first step was to count all livestock. It was like taking a picture of the whole family. We did not want to put the focus on specific members or parts. It is the sum of all parts that impact the environment. For this reason, the livestock needed to be added together, regardless of type and age.

Like apples and oranges, different elements cannot always be added together. To create one grouping, an equivalency scale was used. Each type of livestock was converted into an "animal unit". The smaller or younger the livestock are, the more animals are required to equal one animal unit. For example, one animal unit would be equivalent to one cow, four sows or 125 broiler chickens. This concept is used in regulations, codes of practice and municipal by-laws related to livestock production.

Animal units were calculated for all farms reporting livestock in the 1996 Census of Agriculture. The estimation included cattle, pigs, poultry, horses, sheep and lambs as well as more exotic animals such as emus, ostriches, elk, deer, bison and wild boars.

The next step was to find an indicator of concentration. It was given the term "livestock density". It is similar to population density which indicates the number of people per square kilometre. But unlike people, who can be found everywhere, livestock can only be found in specific areas (on farmland). For this reason, livestock density was measured by dividing the total number of animal units by the total area of farmland.

The calculation was repeated for all farms within 20 kilometres of the location of each farm headquarters. Livestock density was measured in animal units per 100 hectares of farmland. One hundred hectares is equivalent to an area of one kilometre by one kilometre.

Each farm was then grouped into three different livestock density classes. Farms with less than three animal units per 100 hectares were grouped in the low density class. Those with a density between three and 80 animal units were labelled as medium density. Farms with a livestock density of more than 80 animal units were classified in the high density class.

Summary

In May 1996, there were over 13 million animal units in Canada. Alberta had the lion's share of the national livestock population, followed by Ontario, Saskatchewan, Quebec and Manitoba.

Over 80% of the animal units were in areas where the density of livestock was not high. Close to 11 million animal units were distributed in medium livestock density areas.

Less than one-fifth of all livestock (18%) were on farms located in areas where the concentration of livestock was high. Most of these were in Quebec, Ontario, Alberta and British Columbia.

In Quebec, nearly half of the animal units were on farms located in a high density area. In British Columbia and Ontario, the ratio was about one in three. (Table 1).

Table 1: Percent of animal units by density class and region.

	High Density	**Medium Density**	**Low Density**
Canada	18	81	1
Atlantic region	7	93	0
Quebec	46	54	0
Ontario	30	70	0
Manitoba	2	98	0
Saskatchewan	0	97	3
Alberta	11	89	0
British Columbia	35	64	1

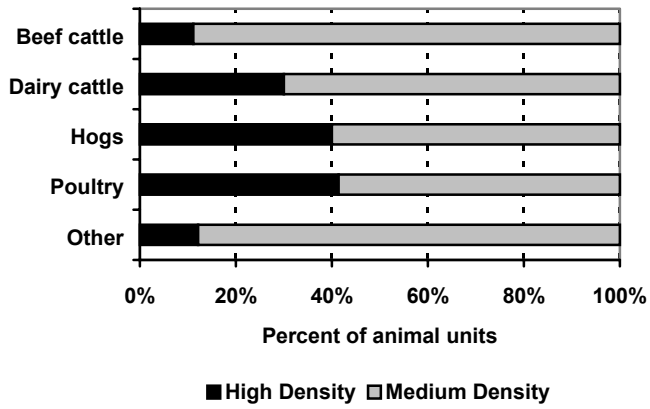
From west to east (see map insert), there were pockets of higher concentrations of livestock in the following regions:

- South of the Fraser River in British Columbia;
- North of Lethbridge, Alberta;
- Near Winnipeg, Manitoba;
- North of Waterloo Regional Municipality and parts of the counties of Perth, Wellington, Bruce and Grey in Ontario; and
- Chutes-de-la-Chaudière, Nouvelle-Beauce, Acton and Haute-Yamaska in Quebec.

What types of livestock were in the higher livestock density class?

At the national level, poultry, hog and dairy animals were more likely to be found in the high density class. (Figure 1). This was not surprising. Dairy, hog and poultry production is concentrated largely in Quebec and Ontario. In these regions, there is relatively less farmland available. Also, hog and poultry operations and, to a lesser extent, dairy operations, are enterprises that purchase much of their feed grains. Thus, they are able to operate on less land.

Figure 1 - Poultry and hogs are most likely to be found in high density areas



Does farm size matter?

Livestock density was not always linked to just the number of animals. Several spots of high livestock density were due to a limited amount of farmland rather than a high livestock population. Some other spots were created by the cumulative effect of several small farms. These observations illustrate the importance of analysing the density of all livestock, regardless of farm size or type of animal. Several small farms may potentially be as harmful to the environment as a few large ones.

The material for this article was taken from an Agriculture Division Working Paper entitled "Distribution and Concentration of Canadian Livestock". This paper contains a complete description of the geo-cartographic methods used in the mapping process. It also includes maps at provincial level. For further information, contact the author or the Agriculture Division user service line at 1 800 465-1991 or by E-mail at agriculture@statcan.ca

Questions or comments on this article may be addressed to Martin Beaulieu at (613) 951-6357 or by E-mail at martin.beaulieu@statcan.ca

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Corn and soybeans grown from genetically modified seed are not unusual

By Bernard Hategekimana

The most widely discussed agricultural topic in recent years is the risks and opportunities presented by food products obtained through biotechnology, especially those derived from genetically modified seeds (GMS). According to the June 2000 survey on field crops, 16% of all soybean acreage in Quebec, and 18% of that in Ontario, was planted with genetically modified seeds. The percentage of corn in both provinces was 27%. Most farms using GMS corn and soybeans are located in Ontario and Quebec where the production of both of these crops is concentrated.

There are two major types of genetically modified seeds available in Canada for corn (Bt corn and Roundup ready corn) and one for soybeans (Roundup Ready soybeans). In the case of Bt corn, a gene from a species of bacteria (*Bacillus thuringiensis)*, has been introduced because it transfers the ability to produce a toxin that kills the European corn borer. When the larvae of this small butterfly eat corn, which has acquired the gene, they die. The corn borer is responsible for serious yield reductions in corn every year. The other type of GMS seed available for corn and soybeans is Roundup Ready seed. In this case, the GMS plant is unaffected by the herbicide Roundup (glyphosate), a nonselective herbicide generally used for weed control.

Points of view on the advantages and risks represented by products obtained from genetically modified plants vary considerably. Scientists and companies who sell GMS and related chemicals feel that the use of genetically modified plants, especially those that are resistant to herbicides and insects, is the best means of controlling pests, reducing the use of chemical pesticides and associated costs, and increasing crop yields. Farmers second this opinion, especially as genetically modified plants allow them greater flexibility in agricultural practices.

At the opposite end of the spectrum are the environmental and other concerns. There are fears that useful insects may be affected and eliminated together with the pests in question, or that resistant insects and weeds that are more difficult to control will appear. Some people even think that food from genetically modified plants such as the Starlink variety of Bt corn, may cause allergies. These concerns are so great that countries such as Japan, Korea, Australia and New Zealand have drafted labeling regulations. The French/German company, Adventis, withdrew its Starlink variey of Bt corn from the market due to the protests of American and foreign consumers. Major baby-food companies like Gerber and Heinz, as well as others, including Bestfoods and Frito-Lay, have already announced that they will stop using genetically modified corn in order to avoid complying with such regulations. The debate is far from over.

Did the GMS varieties deliver higher yields?

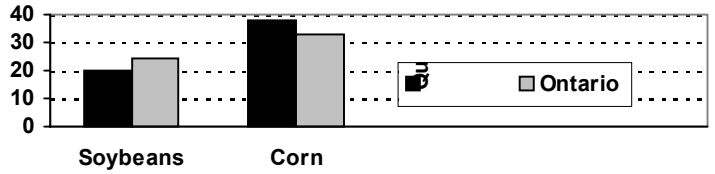
It is difficult to draw conclusions from the November 2000 survey which provided the yield data. The growing conditions in the summer of 2000 were cool and wet in the major corn and soybean growing regions. As a consequence, yields in general were substantially lower than normal. In addition, this survey does not control for other management and environmental factors such as use of fertilizer or local weather events. Hence the difficulty with direct comparisons between GMS and non-GMS yields. However, given these limitations, the average yield of GMS corn exceeded the average corn yield in Quebec by11 bushels per acre (12%). In Ontario the difference was 4 bushels per acre (4%). In the case of soybeans, the yield

of GMS varieties in Quebec was 1.5 bushels per acre (4%) higher than the provincial average and 1.0 bushels per acre (3%) higher in Ontario.

More producers used GM corn than soybean.

The percentage of corn growers using GMS was 38% for Quebec and 33% for Ontario. For soybean, the figures were 20% for Quebec and 24% for Ontario (Graph 1).

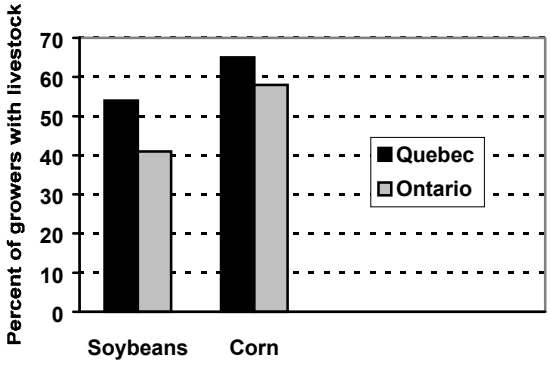
Graph 1 - More corn growers use GMS seeds than soybean growers



More than 40% of farms using GMS were also involved in livestock.

In Quebec, 65% of corn growers using GMS also had livestock; the figure for soybean is 54%. The figures for Ontario are 58% and 41% respectively (Graph 2).

Graph 2 - More than 40% of growers using GMS also raised livestock



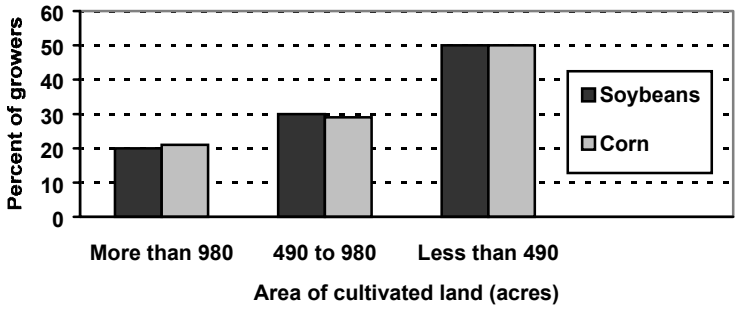
Most of the growers of GMS varieties are found among the smaller farms.

At least half of them in both Ontario and Quebec have a cultivated area of less than 490 acres.
(Graphs 3 and 4)

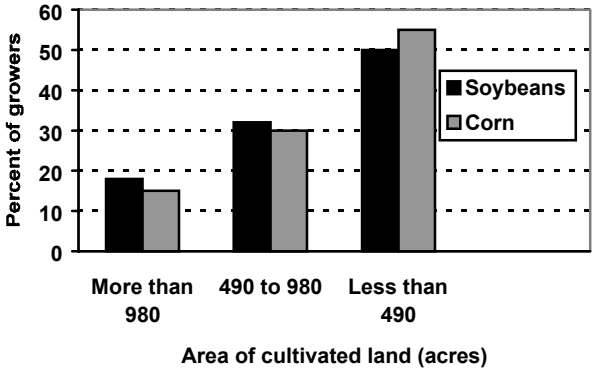
The questions about the use of GMS varieties of corn and soybeans were included for the first time on the Surveys of Field Crops in the growing season of 2000. These questions will be asked again in 2001. The results were published in Statistics Canada Catalogue No.21-002-XPB.

Questions or comments regarding this article may be addressed to Bernard Hategekimana at (613) 951-5304 or via the Internet at: bernard.hategekimana@statcan.ca

Graph 3 - Smaller growers choose GMS varieties more often in Ontario



Graph 4 - Smaller farms in Quebec prefer GMS varieties



CURRENT CANADIAN AGRICULTURAL INDICATORS

	1999	2000	Percent Change
Crop Production December 5 Estimate (million tonnes)			
Wheat	26.9	26.8	0
Oats	3.6	3.4	-6
Barley	13.2	13.5	2
Canola	8.8	7.1	-19
Flaxseed	1.0	0.7	-30
Corn for Grain	9.2	6.8	-26
Soybeans	2.8	2.7	-4
Dry Peas	2.3	2.9	26
Cattle on Farms (million head)			
Total Cattle - Year End	12.8	12.9	1
Calves Born	5.1	5.0	-2
Pigs on Farms (million head)			
Total Pigs - Year End	12.2	12.0	-2
Sows Farrowed July-December	1.3	1.4	8
Sows to Farrow January-June 2000, 2001	1.4	1.4	0
Milk Sold Off Farms (million kilolitres)			
January - December	7.5	7.4	-1
Chicken Meat Production (thousand tonnes)			
Total	840	877	4
Egg Production (million dozen)			
Total	519	543	5
Planted Area of Fruit (thousand hectares)			
Apples	30.1	28.9	- 4
Strawberries	6.1	5.6	- 8
Blueberries	35.4	36.8	4
Grapes	7.7	7.5	- 3
Planted Area of Vegetables (thousand hectares)			
Field Vegetables	114	113	-1
Potatoes	159	158	-1

CURRENT CANADIAN AGRICULTURAL INDICATORS

	1999	2000	Percent Change
International Trade in Agricultural Commodities and Food (billion dollars)			
Exports	24.6	26.5	8
Imports	17.2	18.2	6
Price Indexes (1992=100)			
CPI Food Component - December	110.9	114.5	3
Farm Cash Receipts (billion dollars)			
Total	30.5	32.5	7
Bankruptcies - Agriculture and related service industries (number)			
Total	287	262	-9
Manufacturing Shipments of Food (billion dollars)			
Total Value	52.4	54.9	5
Retail Trade in Food Stores (billion dollars)			
Total Value	58.9	61.2	4
Population (million persons)			
October 1	30.6	30.8	1
Employment (million persons)			
December	14.6	15.0	3
Raw Unemployment Rate (percent)			
December	6.8	6.8	0

Scheduled Releases of Agricultural Information

March 1, 2001 through September 1, 2001

Field Crops

April 24 - March seeding intentions of principal field crops by province for 2001 (Catalogue No. 22-002-XPB).

May 8 - Stocks of Canadian grain at March 31, 2001 (Catalogue No. 22-002-XPB).

June 29 - Preliminary estimates of principal field crop area for 2001(Catalogue No. 22-002-XPB).

August 28 - July 31, 2001 estimate of production of principal field crops (Catalogue No. 22-002-XPB).

Grain Markets

March 28
April 26
May 29
June 29
July 27
August 27 - Cereals and oilseeds market statistics, monthly (Catalogue No. 22-007-XPB).

May 29 - Grain Trade of Canada 1999-00 (Catalogue No. 22-201-XPB)

Horticulture Crops

July 20 - Preliminary estimates of potato area by province for 2001 (Catalogue No. 23-008-UIB).

June 15 - Area of fruit and vegetable crops by province for 2001 (Catalogue No. 22-003-XIB).

April 27 - Greenhouse, sod and nursery industries (Catalogue No. 22-202-XIB).

Food Consumption

June 14 - Supply, disposition and per capita disappearance of cereals, sugars, syrups, pulses, nuts, beverages, dairy products, poultry, eggs and meats for 2000 (Catalogue No. 32-229-XPB/XIB).

Livestock and Animal Products

May 14
August 13 - Farm sales of milk for fluid and manufacturing purposes, production and stocks of creamery butter, cheddar cheese and other dairy products by province, quarterly (Catalogue No. 23-001QXPB/XIB).

April 26 - Inventories of pigs by province at April 1 (Catalogue No. 23-603-UPE).

August 23 Inventories of pigs, cattle and sheep by province at July 1 (Catalogue No. 23-603-UPE).

April 26 - Wildlife fur production for 2000 (Catalogue No. 23-603-UPE).

August 23 - Report on fur farms by province for 2000 (Catalogue No. 23-603-UPE).

May 15 - Production of poultry and eggs by province, 2000 (Catalogue No. 23-202-XIB).

Scheduled Releases of Agricultural Information

March 1, 2001 through September 1, 2001

Livestock and Animal Products

March 18 - Aquaculture economic statistics (Catalogue No. 23-603-UPE).

August 15 - Aquaculture (Catalogue No. 23-603-UPE).

March 28 - Stocks of frozen meat products by province, monthly (Catalogue No. 23-009-XIE).
April 26
May 30
June 28
July 26
August 30

March 19 - Stocks of frozen poultry meat by province, monthly (Catalogue No. 23-603-UPE).
April 20
May 17
June 19
July 19
August 20

March 5 - Egg production and number of laying hens by province, monthly (Catalogue No. 23-003-XPB).
April 9
May 8
June 7
July 6
August 10

Farm Income and Prices

May 28 - Farm cash receipts by province, quarterly (Catalogue No. 21-001-XIB).
August 27

May 28 - Estimates of agricultural economic indicators for 2000: farm income, farm cash receipts, farm operating expenses and depreciation charges, current values of farm capital, farm debt outstanding and direct program payments (Catalogue No. 21-603-UPE).

Users may obtain these releases on the date of release through the contacts listed on the next page. Much of the data is available in machine readable form in CANSIM at the same time. The publications will be available at a later date.

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